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2, AgRISTARS

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Soil Moisture / Early Warning and Crop Condition Assessment

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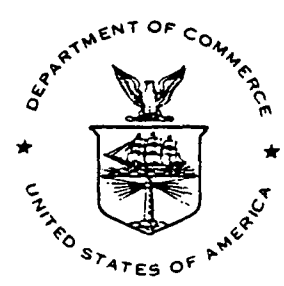
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INTERFACE CONTROL DOCUMENT

SOIL MOISTURE PROJECT
AND EARLY WARNING/CROP CONDITION ASSESSMENT
PROJECT

JULY 1980

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INTERFACE CONTROL DOCUMENT
SOIL MOISTURE -
EARLY WARNING/CROP CONDITION ASSESSMENT
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1.1 PURPOSE

This Interface Control Document (ICD) defines the interactions and support functions required between the Early Warning/Crop Condition Assessment (EW/CCA) Project and Soil Moisture (SM) Project.

This ICD outlines and defines the requirements for EW support of SM and vice versa. Tasks in support of these interfaces are defined for development of support functions.

1.2 INTRODUCTION

The EW Project will develop, test and evaluate techniques and procedures for adapting remote sensing technology to provide early warning of events and the timely assessment of those factors which affect the quality and quantity of production of economically important crops. Those techniques to augment and reinforce the current assessment activities will be developed to improve the definition of the relationship between the plant(s) and its environment. This assessment and evaluation will certainly include the need for soil moisture measurement and estimation. This ICD will address those interactions.

The SM Project will develop, test, and evaluate techniques and procedures to measure or predict soil moisture in the root zone using both contact and remote sensors. The ultimate goal of the SM Project is to produce an operational soil moisture measurement system that can accurately and in near real time provide soil moisture data in the root zone of soils over large land areas.

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2.0 PROJECT INTERFACES

The development, testing and evaluation of soil moisture and early warning techniques are very closely related. Data acquired to support these activities for soil moisture estimation will be most useful in early warning/crop condition assessment and vice versa. Many assessment techniques have soil moisture measurements as an integral part of the assessment process. Task output and related data developed as a part of either project will be furnished the other project.

Data collected by or made available to either SM or EW will be made available to the other project. Close liaison between the two projects through day to day contacts, project reviews, formal interfaces and progress reports will continue through the entire time-frame of AgRISTARS.

2.1 SOIL MOISTURE PROJECT RESPONSIBILITIES

The Soil Moisture Project will develop and test several soil moisture estimation techniques useful as independent variables or as integral components for crop condition assessment. Soil moisture measurement and estimation techniques will be made available to EW as they are developed. Soil moisture models will be furnished along with input requirements, documentation, and operating instructions.

2.1.1 In Situ Sensor Development

Results of the in situ sensor development and evaluation is of interest to EW crop scientists developing alarm techniques where soil

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Results of the comparative testing of root zone soil moisture models along with a sensitivity analysis of results to input data parameters will identify candidate models for root zone soil moisture predictions and a component for plant stress estimation. Documentation of the models and results will be made available to other AgRISTARS personnel.

Models or algorithms developed to estimate large area or large scale soil moisture will be very useful to crop condition and plant stress predictions. Methods to extrapolate point data to large areas will also be useful for crop condition assessment. Documented models or algorithms will be furnished EW project management for development use.

Copies of the completed summary report on "Remote Sensing of Soil Moisture" will be delivered to EW project management for researchers' use.

2.2 Early Warning/Crop Condition Assessment Project Responsibilities

The Early Warning/Crop Condition Assessment Project (EW) will support the Soil Moisture Project through the testing and evaluation of methodology to:

- o Assess crop water stress
- o Relate remotely sensed data to plant vigor or stress
- o Derive solar radiation estimates from cloud cover
- o Estimate precipitation amounts from meteorological satellite data

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useful to SM in expanding point soil moisture estimates to large areas. These sampling procedures and methods will be furnished to the SM Project Manager when they are documented.

Pasture-range condition assessment techniques developed may be useful to SM in evaluating its methodology of expanding point soil moisture to large areas. Contractor reports on this activity will routinely be delivered to the SM Project Manager as they are received in EW.

Relationships determined among spectral data, plant components and agronomic variables will utilize soil moisture measurements and determinations as a part of the overall research. Correlation of leaf area, biomass, growth stage, ground cover, plant canopy temperature to soil moisture and plant stress will be determined. Results of these studies at Beltsville, Weslaco, Phoenix, Davis and other selected areas will be made available to the SM Project.

Procedures using current metsat (thermal channel) data to construct daily stress maps will be furnished the SM Project for evaluation as a tool in large area soil moisture estimation. Plant water stress measurement techniques utilizing Heat Capacity Mapping Mission (HCMM) and Thematic Mapper (TM) data will be documented and furnished SM researchers as the documents are prepared.

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verified to be reliable precipitation estimators will be made available to soil moisture scientists for use in developing methods to estimate soil moisture over large areas.

3.0 TASKS

Tasks identified in this ICD are defined in the EW and SM Project Implementation Plans (Parts 5.2 and 5.3).

4.0 DATA AND PRODUCTS

Products referred to in this ICD are identified and described in Part 4 of each task description of the Project Implementation Plans (Parts 5.2 and 5.3). Data acquired to support individual AgRISTARS project needs are available to other projects as outlined in the AgRISTARS Data Management Plan (Part 5.4).

5.0 REFERENCE DOCUMENTS

- 5.1 NASA, NOAA, USDA, USDI Memorandum of Understanding dated February 20, 1980.
- 5.2 Soil Moisture Project Implementation Plan
- 5.3 Early Warning/Crop Condition Assessment Project Implementation Plan
- 5.4 Data Management Plan, AgRISTARS PMT

Soil Moisture/Early Warning and Crop Condition Assessment

Interface Control Document

November 24, 1980

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